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The impact of IMF conditionality on government health expenditure: A cross-national analysis of 16 West African nations

Author list

Thomas Stubbs[1,2], Alexander Kentikelenis[3,4], David Stuckler[3], Martin McKee[5], Lawrence King[1]

1 – Department of Sociology, University of Cambridge

2 – School of Social Sciences, University of Waikato

3 – Department of Sociology, University of Oxford

4 – Department of Sociology, Harvard University

5 – European Observatory on Health Systems and Policies, London School of Hygiene and Tropical Medicine

Corresponding author

Name:

Thomas Stubbs

Email:

ths27@cam.ac.uk

Affiliation:

Centre for Business Research, University of Cambridge

Address:

University of Cambridge - Sociology Researcher

17 Mill Lane

Cambridge, Cambridgeshire CB2 1RX

United Kingdom

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Abstract:

How do International Monetary Fund (IMF) policy reforms—so-called 'conditionalities'—affect government health expenditures? We collected archival documents on IMF programmes from 1995-2014 to identify the pathways and impact of conditionality on government health spending in 16 West African countries. Based on a qualitative analysis of the data, we find that IMF policy reforms reduce fiscal space for investment in health, limit staff expansion of doctors and nurses, and lead to budget execution challenges in health systems. Further, we use cross-national fixed effects models to evaluate the relationship between IMF-mandated policy reforms and government health spending, adjusting for confounding economic and demographic factors and for selection bias. Each additional binding IMF policy reform reduces government health expenditure per capita by 0.248 percent (95% CI -0.435 to -0.060). Overall, our findings suggest that IMF conditionality impedes progress toward the attainment of Universal Health Coverage.

Keywords:

health systems, International Monetary Fund, West Africa, health expenditures, universal health coverage

Word count:

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1. Introduction

Strengthening public healthcare systems is central to achieving Universal Health Coverage (UHC), a key objective of the United Nation's Sustainable Development Goals (UNGA, 2015; WHO, 2014). Yet, in low-income countries (LICs), especially those dependent on aid or subject to fluctuating commodity prices, it is unclear how progress can be sustained. Recent studies highlight the importance of funding UHC through increasing domestic tax revenues and employer contributions (O'Hare, 2015; Reeves et al., 2015). Success will also depend on the ability to overcome longstanding barriers to health system expansion, including legacies of conflict, state failure, and underinvestment in healthcare facilities and personnel (Benton & Dionne, 2015). Foreseeably, a multitude of global actors will contribute to shaping the design, implementation, and ultimate outcome of these endeavours (Chorev, 2012; Patel & Phillips, 2015).

Quite possibly the most important international institution setting the fiscal priorities of LICs is the International Monetary Fund (IMF). Established in 1944, a core function of the organization has been to provide financial assistance to countries in economic turmoil. In exchange for this support, countries agree to implement IMF-designed policy reform packages phased over a period of one or more years—so-called 'conditionalities'. Over the past two decades, the 59 countries classified by the IMF (2015b) as LICs have been exposed to conditionalities for 10.3 years on average, or one out of every two years. The IMF's extended presence in LICs has spurred a great deal of controversy. Critics stress inappropriate or dogmatic policy design (Babb & Buira, 2005; Babb & Carruthers, 2008; Stiglitz, 2002), adverse effects on the economy (Dreher, 2006), and negative social consequences (Abouharb & Cingranelli, 2007; Babb, 2005; Oberdabernig, 2013).

In relation to health, the IMF has long been criticized for impeding the development of public health systems (Baker, 2010; Batniji, 2009; Benson, 2001; Benton & Dionne, 2015; Cornia,

Jolly, & Stewart, 1987; Goldsbrough, 2007; Kentikelenis, King, McKee, & Stuckler, 2015; Kentikelenis, Stubbs, & King, 2015; Ooms & Hammonds, 2009; Stuckler, Basu, & McKee, 2011; Stuckler, King, & Basu, 2008; Stuckler & Basu, 2009). For example, a recent qualitative analysis of IMF programmes in Guinea, Liberia, and Sierra Leone found that the organization contributed to the failure of health systems to develop, thereby exacerbating the Ebola crisis (Kentikelenis et al., 2015a). The IMF's policy advice was associated with fewer public health resources, difficulties in hiring and retaining health workers, and unsuccessful health sector reforms. The IMF responded by arguing that its programmes strengthen health systems (Clements, Gupta, & Nozaki, 2013; Gupta, 2010, 2015). Box 1 summarises the debate between the IMF and its critics.

[Box 1 about here]

To revisit these controversies, we use original documents collected from the IMF's Archives to examine whether and how IMF-mandated policy reforms have impacted government health expenditures in West Africa. We also construct a novel dataset of IMF-mandated policy reforms to evaluate quantitatively the impact of IMF lending conditionalities on government health spending in the region.

2. Methods

2.1 Data sources and study design

We collected 484 documents—primarily loan agreements and staff reports—from the IMF Archives in Washington DC and online pertaining to the 16 West African countries (UN Statistics Division classification): Benin, Burkina Faso, Cabo Verde, Cote d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, and Togo. When requesting a loan from the IMF, countries send a letter to its

management setting out the loan specifics (e.g. amount and duration), main objectives, and associated conditionality. These documents—drafted by country policymakers in collaboration with IMF staff—are known as Letters of Intent with attached Memoranda of Economic and Financial Policies, and are reviewed and updated in regular intervals. For example, a programme that is reviewed five times over its duration is linked to six Letters of Intent and Memoranda of Economic and Financial Policies: one for the original approval and then one for each review. The IMF also produces its own staff report to accompany each Letter of Intent, which contains information on macroeconomic developments, policy discussions, programme monitoring, as well as a concluding staff appraisal. We use these documents in a mixed methods research strategy. In doing so, we seek to avoid the risks of presenting selective evidence that can be associated with qualitative research, while yielding nuanced accounts that supplement statistical associations and illuminate causal pathways.

First, to map potential mechanisms of how IMF policies impact government health spending, we searched our archival material for information related to health systems and social protection policies. Our search terms included 'health', 'medic*', 'pharm*', 'pro-poor', 'social', 'poverty', 'labor', and other related keywords. To ensure that outliers were not captured, we only report pathways for which evidence was identified in three or more countries. While these mechanisms provide expositional clarity, they should not be viewed as wholly representative of the countries considered. That is, not all pathways apply to all countries under study (or during all IMF programmes), and it is possible that additional pathways exist that we were unable to capture. To our knowledge, this study is among the first to systematically deploy the IMF's own primary documents to identify specific IMF policy reforms related to health.

Second, we utilised these records to develop a new measure of exposure to IMF influence, which we then employed to quantify the association between IMF programmes and

government health expenditures. We extracted all IMF loan conditions applicable to West African countries between 1995 and 2014, and disaggregated them into those which are binding and non-binding. During conditionality extraction and classification, we replicated coding to ensure inter-coder reliability and minimize measurement error.

In our quantitative analysis, we focus on binding conditions because they directly determine scheduled disbursements of loans, whereas non-binding conditions serve as markers for broader progress assessment (IMF, 2001b)—that is, non-implementation does not automatically suspend the loan—and may thus introduce noise to the analysis if included. Web Appendix 1 provides further details on the categories of conditions.

Our measure advances on previous research, which has relied on dummy variables or numbers of years of exposure to characterise IMF influence and has therefore overlooked heterogeneity in conditionality across programmes (Murray & King, 2008). While the IMF has its own conditionality database, known as Monitoring of Fund Arrangements (MONA), this database has been criticized by researchers and the IMF's own Independent Evaluation Office (Arpac, Bird, & Mandilaras, 2008; IEO, 2007a; Mercer-Blackman & Unigovskaya, 2004). First, the data is collected *ad hoc* from IMF desk economists, rather than being sourced directly from the loan agreements (Mercer-Blackman & Unigovskaya, 2004). Second, the data is presented in a way that precludes use in academic research: a large number of conditions are duplicates (thereby necessitating extensive and error-prone data cleaning), a break in reporting exists in 2002, and some reported conditions lack crucial information like the intended date of implementation. Third, underreporting and misclassification of conditions is ubiquitous in the MONA database (IEO, 2007a; Mercer-Blackman & Unigovskaya, 2004).

Figure 1 summarizes the conditions applicable in all IMF loans for each country in Africa between 1995 and 2014, recorded from our own research. As shown, West Africa stands out

as having the highest number of conditions across the continent, totalling 8,344 (4,886 binding and 3,458 non-binding) across the 16 countries.

[Figure 1 about here]

2.2 Statistical models

We investigate the effects of IMF conditionality on government health spending per capita reported by the World Bank (2015), which covers the period 1995-2012. We take the natural logarithm of this variable due to its skewed distribution. In a separate analysis, we also examine government health spending as a share of GDP. Results did not substantively change, so we present these findings in Web Appendix 6. We report additional data sources and descriptive statistics in Web Appendix 2.

Following previous research, we include several controls in the analysis. First, we control for GDP per capita because health spending is expected to increase as economic development takes place (Brady & Lee, 2014; Nooruddin & Simmons, 2006; Wagner, 1994). Second, we include overseas development assistance, as it may provide additional funds that the state can spend on health or—alternatively—displace health spending from the government to the non-government sector (Lu et al., 2010). Third, we control for the dependency ratio—i.e., the combined share of the population aged under 15 and over 65—as it is expected to be associated with higher expenditures due to the greater health burdens of these age groups (Nooruddin & Simmons, 2009). Fourth, we include a variable for levels of urbanisation, since urban dwellers can mobilize demands for additional healthcare services from governments, and cities also offer economies of scale (Baqir, 2002; Bates, 1981). Fifth, given the propensity of violent conflict to inflict costly damages on public health infrastructures, we control for the occurrence of war (Ghobarah, Huth, & Russett, 2003). Sixth, we introduce country fixed effects to account for time-invariant country-level characteristics, and year fixed effects to control for common external shocks across all countries.

Because countries are not randomly assigned into a 'treatment group' of IMF programme participants in a given year, we also need to control for unobservable factors—such as the political will to implement reforms—that affect both IMF participation and government health spending (Vreeland, 2003). If we fail to account for these unobserved factors, then their effect will be incorrectly attributed to IMF conditionality. Following previous studies (Clements et al., 2013; Dreher & Walter, 2010; IEO, 2003; Kentikelenis, Stubbs, et al., 2015; Nooruddin & Simmons, 2006; Wei & Zhang, 2010), we control for bias due to non-random country selection into IMF programmes by including the inverse-Mills ratio in our model (Heckman, 1979). These values are generated in a separate probit model predicting IMF programme participation in Web Appendix 5. A significantly negative coefficient on the inverse-Mills ratio indicates that unobserved variables that make IMF participation more likely are associated with lower government health expenditure; a significantly positive coefficient indicates that unobserved variables that make IMF participation more likely are associated with higher government health expenditure (Kentikelenis, Stubbs, et al., 2015).

We employ cross-national multivariate ordinary least squares (OLS) models using the following equation:

$$HXP_{it} = \alpha + \beta_1 IMFCOND_{it-1} + \beta_2 IMFPROG_{it-1} + \beta_3 GDPPC_{it-1} + \beta_4 ODA_{it-1} + \beta_5 DEP_{it} + \beta_6 URBAN_{it} + \beta_7 WAR_{it} + \beta_8 INVMILLS_{it} + \mu_i + \psi_t + \varepsilon_{it}$$

Here, *i* is country and *t* is year. *HXP* is the natural log of government health expenditure per capita in constant 2005 US dollars. *IMFCOND* is the number of binding conditions (known as 'prior actions' or 'performance criteria') applicable to a country. *IMFPROG* is a dummy variable for whether a country was participating in an IMF programme, included to capture effects not related to conditionality (e.g., stemming from the catalytic effect of IMF programmes for the involvement of donors). The two IMF variables are correlated at $r = 0.58$, indicating no issues of collinearity (see Web Appendix 4). *GDPPC* is the natural log of gross

domestic product per capita in constant 2005 US dollars. *ODA* is the natural log of net overseas development assistance per capita. These variables enter the model lagged one year to correspond with the budget cycle. In addition, *DEP*, the dependency ratio, *URBAN*, the proportion of the country's population living in urban areas, and *WAR*, a dummy variable for the occurrence of 1,000 or more deaths in a year from armed conflict, enter the model contemporaneously. *INVMILLS* is the inverse-Mills ratio that controls for non-random country selection into IMF programmes. Finally, μ is a set of country dummies (i.e., country fixed effects), ψ is a set of period dummies (i.e., year fixed effects), and ε is the error term. Standard errors are calculated using the clustered Sandwich estimator, which adjusts for heteroscedasticity and serial correlation. Im-Pesaran-Shin tests on the dependent variable reject the null hypothesis that the panels contain a unit root, whether demeaned, with a time trend, or both (Im, Pesaran, & Shin, 2003). Analyses are performed using Stata version 13.

3. Qualitative results

Our archival research reveals three pathways linking IMF-supported policies to government health spending: fiscal space for investment; wage and personnel caps; and health system budget execution.

3.1 Fiscal space for health investment

IMF programmes in West African nations often included conditions intended to augment minimum expenditures in priority areas, including health. If effectively implemented, these "priority spending floors" can contribute to increases in budgetary allocations for health (IMF, 2015a), as in the case of Gambia in 2012 (IMF, 2013). However, Table 1 shows these targets were frequently not met in our sample of countries. Of the 210 priority spending floors for which we could identify implementation data, only 97 were implemented, about 46%.

[Table 1 about here]

Moreover, we find evidence that macroeconomic targets set by the IMF—for example, on budget deficit reduction or international reserve holdings—crowded out health concerns. Cabo Verde provides a case in point. In 2004, IMF staff, concerned by reductions in Cabo Verde's fiscal surplus, warned of "the importance of ensuring, in the medium term, that the pace of implementation of their poverty reduction strategy did not exceed available resources" (IMF, 2003b, p. 8). In response, Cabo Verdean authorities indicated that meeting IMF-mandated fiscal targets would interrupt recruitment of new doctors (IMF, 2003b). The country later reported to the WHO a 48% decrease in the number of physicians between 2004 and 2006 (WHO, 2015).

Another example is Mali, which was exposed to IMF programmes from 1995 to 2010. In 2005, when government expenditure on health reached 3.0% of GDP, IMF staff encouraged authorities to reduce spending due to concerns that "financing substantial increases of education and health sector wages with HIPC [Heavily Indebted Poor Countries] Initiative resources might eventually prove unsustainable" (IMF, 2005c, p. 14). Similarly, authorities in Benin—a country that met only 10 of its 30 social spending floors—cut poverty reduction spending (including health) in 2005 to "ensure achievement of the main fiscal objectives" (IMF, 2006a, p. 37). Such patterns were also observed in Guinea and Sierra Leone, where recent governments have reported an inability to meet social spending floors due to government expenditure reductions mandated in their IMF programmes (IMF, 2014a, 2014b).

3.2 Health sector wages and personnel

Of the 320 country-years examined here, West African countries experienced a combined total of 211 years with IMF conditions, 45% of which, or 95 years, included conditions stipulating layoffs or caps on public-sector recruitment and limits to the wage bill. These targets can impede countries' ability to hire, adequately remunerate, or retain health-care

professionals (McColl, 2008), although the IMF has argued that health sector spending is protected (Verhoeven & Segura, 2007).

The case of Ghana is illustrative. In 2005, a series of conditions aimed to reduce the country's public-sector wage bill by 0.6% of GDP over three years (IMF, 2005a). Domestic authorities defended wage spending levels on the grounds of, *inter alia*, social sector needs (IMF, 2005b). The Ghanaian Minister of Finance wrote to the IMF that "at the current level of remuneration, the civil service is losing highly productive employees, particularly in the health sector," and that wage bill limits raised concern about the country's ability to meet its "goal of bolstering service delivery and value for money" (IMF, 2006b, p. 55). Nonetheless, wage ceilings were maintained until the end of the programme in late-2006, during which period Ghana experienced a reduction in healthcare staff: nursing and midwifery personnel decreased from an estimated 0.92 per 1,000 people in 2004 to 0.68 in 2007; the numbers of physicians halved from 0.15 per 1,000 people to 0.07 (WHO, 2015).

Another case is Sierra Leone, which was exposed to several years of limits placed on public-sector wage spending (IMF, 2006c). This corresponded to the country experiencing a reduction in the already low numbers of physicians, from 0.033 per 1,000 inhabitants in 2004 to 0.016 in 2008 (WHO, 2015). To counter this, the government launched its Free Health Care Initiative buttressed by the promise of a living wage for physicians. Yet, IMF staff raised concerns about the fiscal implications and advocated "a more gradual approach to the salary increase in the health sector" (IMF, 2010, p. 10). Similarly, when Cote d'Ivoire was subject to a wage bill ceiling in 2002, IMF staff expressed concern that pressure from Ivorian health workers for salary increases posed a "risk to the program, [and would] derail efforts to rein in the wage bill" (IMF, 2002a, p. 24).

Likewise, Senegal had a decade of wage bill ceilings and hiring freezes under successive IMF programmes since 1994. Domestic authorities wrote to the IMF in 2004 that severe personnel

shortages had affected the quality of public service in social sectors (IMF, 2004b). Medical 'brain drain,' a phenomenon linked to inadequate remuneration (McColl, 2008), had heavily encumbered the country: in the early-2000s, a conservative estimate of the number of physicians abroad as a fraction of total Senegalese physicians was 51%, against the sub-Saharan African mean of 28% (Clemens & Pettersson, 2008).

3.3 Health system budget execution

Another element of IMF reforms relevant to health systems in West Africa is the introduction of budget monitoring and execution systems. When appropriately designed, such measures can contribute to an increase of budgetary allocations on health that reach the intended target and reduce leakages. For instance, in the late 1990s, IMF staff noted that Benin consistently spent less on health than was approved in budgetary appropriations (IMF, 1998a). The organization then prioritised assistance to the country to improve the utilization of social sector appropriations (IMF, 1998a), ultimately contributing to higher spending (IMF, 2000).

We find evidence that steps towards improving budget execution often translated into fiscal and administrative decentralisation of health-care systems. In principle, decentralisation can make health systems more responsive to local needs, but—in practice—it often created governance problems, exacerbating local institutional weaknesses. For instance, following IMF advice, Guinean authorities transferred budgetary responsibilities from the central government to the prefectural level in the early 2000s (IMF, 2001a, 2002b). Five years later, an IMF mission to the country reported "governance problems" that included "insufficient and ineffective decentralisation", while also noting deterioration in the quality of health-service delivery (IMF, 2007, p. 4).

Mali's decentralisation of health services in the late-1990s under IMF tutelage was similarly problematic (IMF, 1998b). By 2004, IMF staff reported that "the effectiveness of the devolution process has been limited so far" due to "insufficient human and financial

resources at the local level, and weak coordination of sectoral policies at the local and central levels" (IMF, 2004a, p. 16). Likewise, Burkina Faso experienced execution issues following the introduction of a decentralized management system for health while under an IMF programme in the late-1990s (IMF, 1997). Several years later, IMF staff reported that "the lack of a fully operational decentralized administrative structure did not allow for an efficient and swift execution of poverty-reducing projects in remote areas" (IMF, 2003a, p. 11). Senegal also introduced IMF-endorsed decentralization measures, including devolution of health spending decisions to regional and local authorities. By the mid-2000s, IMF staff reported delays in the implementation of health policy reforms due to "weak financial programming and monitoring capacities at the decentralized level" (IMF, 2004c, p. 89), and noted that "health expenditure declined, owing to low implementation capacity" (IMF, 2005d, p. 8).

4. Quantitative results

Having identified three areas of conditionality linked to reductions in government health expenditure, we turn to evaluating this relationship using quantitative methods. Table 2 presents the results of the cross-national statistical model of the association of IMF conditionality and programme participation with government health spending, adjusted for potential confounding economic and demographic factors. Since the dependent variable has been log-transformed, effects of predictors are interpreted as percent changes in government health spending equivalent to the coefficient multiplied by 100 (except where a predictor is also log-transformed in which case the multiplication is not required). In Model 1, we exclude the IMF conditionality variable but include the IMF programme dummy variable, which yields a positive but statistically non-significant association with government health

spending. This indicates that the combined effect of the IMF's credit, technical assistance, aid catalysis, and conditionality on government health spending is no different from zero.

[Table 2 about here]

In Model 2, we include the IMF conditionality variable in addition to the IMF programme dummy. At standard thresholds of statistical significance, exposure to an additional binding IMF condition is associated with a decrease of 0.248% (95% CI -0.435 to -0.060) in government health spending per capita. However, outside of the conditionality channel (e.g., the IMF's credit, technical assistance, or catalytic effect on aid), the IMF still does not appear to affect health spending. In Figure 2, we illustrate the joint effect of IMF programme participation and conditionality on government health spending per capita, varying the number of conditions, and compare it against a scenario where there is no IMF programme. The plot should be interpreted with caution, as results of a partial Wald test showed that the combined IMF condition and programme effect was not statistically different from zero.

[Figure 2 about here]

For control variables, official development assistance is also associated with increases in government health spending. As noted earlier, selection into IMF programs is not random, which can introduce bias to the analysis. Our model includes the Inverse-Mills ratio to control for this issue, finding unobserved factors that make IMF participation more likely are associated with higher government health spending. We find no statistically significant association for GDP per capita, the dependency ratio, urbanisation, or the occurrence of war. Our model explains 91% of the total variation.

Setting government health spending per capita at the mean value of our entire sample—$14.66 constant 2005 US dollars—we calculate the effect of one additional IMF condition on government health spending as an average reduction of $0.036 per person, all other factors held constant. The mean number of binding conditions when countries participate in IMF

programmes, at 25 per year, thus corresponds to a reduction of $0.91 per capita (a 6.21% decrease in government health spending per capita).

In robustness checks, presented in Web Appendix 6, we adopt an alternative approach to account for endogeneity concerns. We deploy a two-stage-lease-squared model with both IMF programme participation and IMF conditionality variables instrumented using United Nations General Assembly (UNGA) voting affinity with the United States and the total number of countries under IMF programmes. UNGA voting patterns provide a measure of foreign policy alignment and have been used as an instrument in several previous studies for various elements of IMF programmes, including participation, loan amount, and share of agreed loan drawn (Barro & Lee, 2005; Dreher, 2006; Oberdabernig, 2013). Countries aligned with the United States tend to receive more favourable treatment from the IMF and thus would receive fewer binding conditions. For the number of countries under IMF programmes, sovereignty costs are perceived to be lower when more countries are on programmes, thus prompting additional countries to participate (Oberdabernig, 2013; Sturm, Berger, & de Haan, 2005). Both variables are unlikely to affect public health expenditure except via the number of binding conditions, thus fulfilling the criteria of an instrumental variable. The Sargan test for overidentification is non-significant, indicating instruments are valid. Our findings remain substantively unchanged.

As an additional test for robustness of results, we also re-estimate the model using our preferred estimation strategy, but with the dependent variable as government health spending as a share of GDP, a widely used measure of political priorities on health. We record consistent results, which are available in Web Appendix 6. Each binding IMF condition is associated with a percent point decrease of 0.007 (-0.013 to -0.001) in government health spending as a share of GDP.

Lastly, we check whether results are driven by outliers. We initially exclude observations with 50 or more conditions—yielding a total of five exclusions—and re-estimate the model. We then exclude based on the less stringent criterion of 40 or more conditions, which eliminates an additional 14 observations. Results remain substantively the same throughout, as reported in Web Appendix 6.

5. Discussion

Our study finds that IMF conditionality reduced government health expenditures in West Africa, the region with greatest exposure to Fund programmes in Africa. We identify three pathways linking IMF-mandated policies to decreases in government health spending in the region: macroeconomic targets that reduce fiscal space for investment in health, limits to wage bills and civil service employment ceilings that inhibit hiring and retention of health staff, and decentralisation measures that amplify budget execution challenges in the health sector.

Before discussing these findings, we note several limitations. First, we restrict our analysis to evidence identified in the IMF's own archival documents. It is possible that additional effects on health systems are not reported in archival data. Future in-depth analyses of country experiences can help uncover these links. Second, statements by country officials may not always be evidence-based, since they may be a product of political expedience. To minimize such potential biases, we have verified the accuracy of officials' statements using various contextual indicators of health system performance (e.g., WHO health systems data). Third, we recognize that the IMF is not the sole international financial institution involved in these countries. Other organizations—like the World Bank and the African Development Bank—also affect health systems in West Africa (Coburn, Restivo, & Shandra, 2015; Ruger, 2005), often in parallel programmes with the IMF. Fourth for our quantitative analysis, we acknowledge that using a binding condition count does not fully capture IMF programme

heterogeneity. Even so, it is still a major advance on previous studies, where program heterogeneity is largely ignored.

Though our quantitative analysis reveals a negative association between IMF conditionality and government health spending, the aggregate impact of the IMF—programme participation and conditionality combined—is not statistically different from zero. Furthermore, our analysis cannot completely rule out that—unlike conditionality—the IMF's credit, technical assistance, or catalytic effect on aid may help increase government health spending. The association of IMF participation with health spending independent of the conditionality channel was positive, but failed to reach standard thresholds of significance (i.e., estimated with low precision). Overall, while we fail to find quantitative evidence that the IMF on aggregate has any impact on government health spending, it is nonetheless the case that each additional binding condition is associated with decreases in government spending.

Our findings have broader implications for contemporary policy debates about the role of the IMF in efforts to reach the global target of UHC. In recent years, the IMF has promoted social protection policies and health systems strengthening as part of its lending programs (IMF, 2015a). However, the evidence presented reveals that—under direct IMF tutelage—some of the world's poorest countries underfunded their health systems. The legacy of such policies affects these countries' progress towards UHC attainment—a key Sustainable Development Goal.

Looking forward, our research suggests that the IMF should consider the potential effects of its policies on public health systems. Given the current momentum for UHC, the organization has the opportunity to facilitate this process by allowing policy space for borrowing countries to invest in health and determine their health policies free from the influence of unduly restrictive conditionalities. In doing so, the IMF can learn from and collaborate with its sister institution, the World Bank, that recently supported the goal of UHC.

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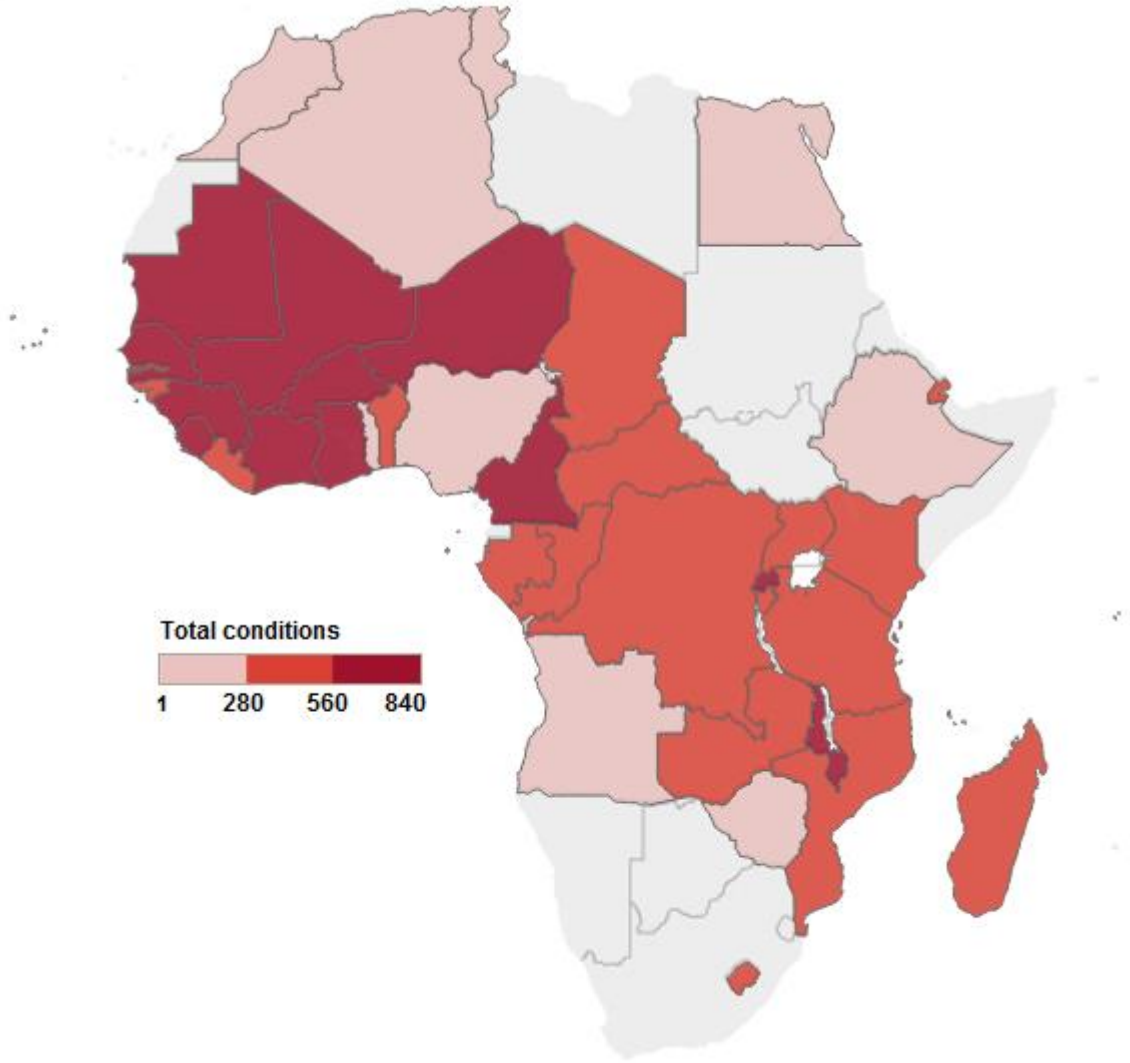
Box 1. How do IMF programmes affect health systems?

The IMF proposes three channels through which its programmes are linked to strengthening of health systems. First, IMF-supported reforms improve economic growth or raise tax revenues, thereby expanding fiscal space to allow governments to invest in public health (Clements et al., 2013; Crivelli & Gupta, 2015). Second, the inclusion of social spending floors in IMF programmes shelters sensitive expenditures from austerity measures (Gupta, Dicks-Mireaux, Khemani, McDonald, & Verhoeven, 2000; Gupta, 2010; IMF, 2015a). Third, implementation of the IMF's policy advice catalyses foreign aid (including for health) and foreign investment (Clements et al., 2013; IEO, 2007b).

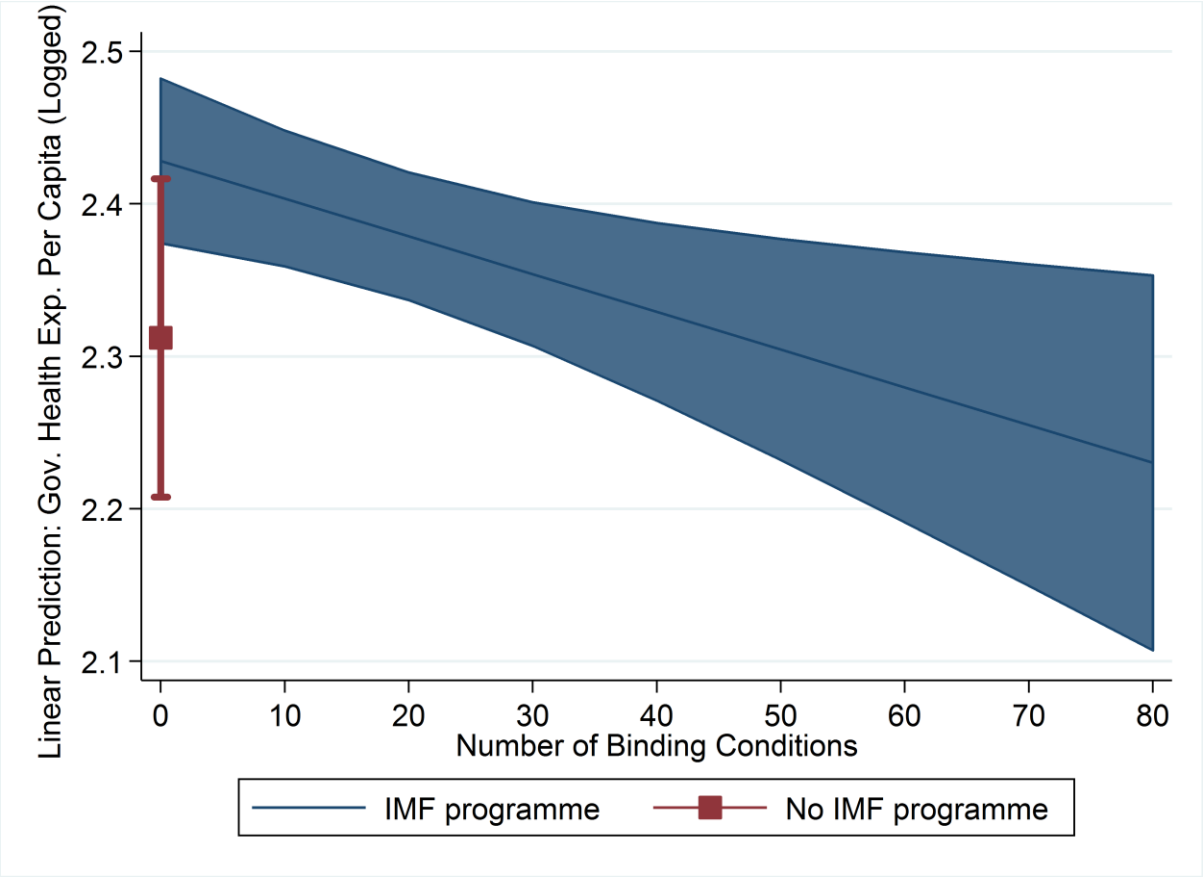
In contrast, critics argue that governments are unable to adequately invest in health because of pressure to meet rigid fiscal deficit targets set by the IMF, and that the organization diverts additional revenues and aid earmarked for the health sector to repay debt or increase reserves (Kentikelenis, King, et al., 2015; Kentikelenis, Stubbs, et al., 2015; Ooms & Schrecker, 2005; Stuckler et al., 2011, 2008; Stuckler & Basu, 2009). Additional evidence suggests that IMF-supported programmes decrease economic growth (Barro & Lee, 2005; Dreher, 2006; Przeworski & Vreeland, 2000), thereby shrinking available resources to fund health systems, and that the organization's programmes do not catalyse health aid (Stubbs, Kentikelenis, & King, 2016).

Figure 1. IMF conditionality in African countries, 1995-2014



Note: Blank space denotes no IMF conditionality applicable in that country.

Figure 2. Joint effect of IMF programme participation and conditionality on government health spending per capita, with 95% confidence intervals



Note: Predictive margins based on Model 2 (see Table 2).

Table 1. Targets on health and other social spending, 1995-2014

	Total	Of which implementation data available	Of which implemented
Benin	30	29	10
Burkina Faso	32	21	8
Cabo Verde	0	0	0
Cote d'Ivoire	29	22	15
Gambia	6	3	3
Ghana	19	16	12
Guinea	27	17	3
Guinea-Bissau	12	7	3
Liberia	15	12	9
Mali	19	16	10
Mauritania	25	13	4
Niger	16	11	2
Nigeria	0	0	0
Senegal	0	0	0
Sierra Leone	42	36	16
Togo	11	7	2
TOTAL	**283**	**210**	**97**

Note: Number of targets (spending floors) reported. Spending floors are set for "priority expenditures" that include health, education, and other social sectors.

Source: Various IMF lending arrangements retrieved from the IMF archives.

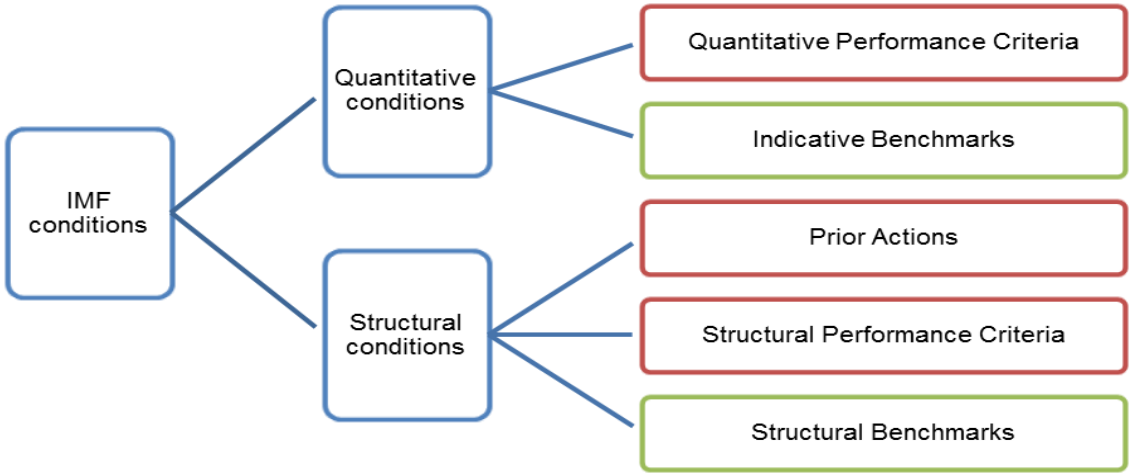
Table 2. Effect of IMF conditionality on government health spending, 1995-2012

	Dependent variable: Log government health expenditure per capita (constant 2005 US$)	
	Model 1: IMF programme dummy only Coefficient [95% CI]	Model 2: IMF programme dummy and number of IMF conditions Coefficient [95% CI]
IMF condition (lagged)		-0.00248* [-0.00435,-0.000599]
IMF programme (lagged)	0.0877 [-0.0568,0.232]	0.116 [-0.0283,0.261]
Log GDP per capita (lagged)	0.547 [-0.365,1.460]	0.543 [-0.350,1.435]
Log ODA per capita (lagged)	0.168** [0.0717,0.264]	0.185** [0.0834,0.286]
Dependency ratio	0.00420 [-0.0105,0.0190]	0.00463 [-0.00986,0.0191]
Urbanisation	0.0901 [-0.00753,0.188]	0.0917 [-0.000751,0.184]
War	0.103 [-0.397,0.602]	0.0849 [-0.419,0.589]
Inverse-Mills ratio	0.678* [0.00140, 0.134]	0.0866** [0.0261,0.147]
Number of countries	16	16
Country-years	276	276
R^2	0.913	0.914

Note: * p<0.05, ** p<0.01, *** p<0.001. Coefficients and 95% CIs are based on robust standard errors clustered by country. All models correct for country and year fixed effects. Data sources and descriptive statistics are provided in Web Appendix 2-3.

Web Appendix 1. Categories of conditions

The IMF's conditions can be either quantitative or structural. The former take the form of quantitative targets that countries have to meet and often maintain throughout the programme period. Structural conditions concern a wider range of reforms in the domestic economy and afford governments less flexibility. Building on the quantitative–structural divide, the IMF formally distinguishes five types of conditions, which are indicative of the relative weight it attaches to their implementation. These five types can be further grouped into binding conditions (those that the IMF places most weight on) and non-binding conditions (less weight attached and can relatively easily be modified as the programme progresses). The Box below illustrates this assemblage and summarizes the key characteristics of each type.



Note: Red boxes identify binding conditions; green boxes identify non-binding conditions.

Quantitative Performance Criteria (QPCs): Specific and measurable conditions that have to be met to complete a review. QPCs relate to macroeconomic variables under the control of the governments, such as monetary and credit aggregates, international reserves, fiscal balances, and external borrowing.

Indicative Benchmarks: Also known as indicative targets, these are used to supplement QPCs for assessing progress. Sometimes they are also set when QPCs cannot because of data

uncertainty about economic trends (e.g. for the later months of a program). As uncertainty is reduced, these targets are normally turned into QPCs, with appropriate modifications.

Prior Actions: Conditions that a country agrees to take before the IMF's EB approves financing or completes a review. The Fund considers these conditions so important as to block access to further financing until they are implemented. They are used especially in cases where the borrowing country has not consistently implemented the programme and the Fund staff doubt commitment to the programme. These are the strictest conditions.

Structural Performance Criteria (SPCs): Structural measures whose implementation is regarded as crucial to the success of the programme and have to be met to complete a review. These conditions often involve legislative reforms such as the enactment of a new banking or bankruptcy law.

Structural Benchmarks: These are (often non-quantifiable) reform measures that are critical to achieve programme goals and are intended as markers to assess programme implementation during a review. They vary across programs: examples are measures to improve financial sector operations, build up social safety nets, or strengthen public financial management.

Web Appendix 2. Description and sources of data

Variable	Description	Source
Government health spending	Measured as per capita (logged) and in robustness checks as a share of GDP	World Bank WDI, May 2015
Binding conditions	Total count of Quantitative Performance Criteria, Structural Performance Criteria, Prior Action conditions in IMF programme	Authors' calculations
IMF programme	Dummy variable: = 1 if IMF programme active for 6 or more months in year of initiation, and at any point in year of completion, 0 otherwise	Authors' calculations
GDP per capita	Gross domestic product per capita in constant 2005 USD (logged)	World Bank WDI, May 2015
ODA per capita	Net overseas development assistance per capita in USD (logged)	World Bank WDI, May 2015
Dependency ratio	Combined share of the population aged under 15 and over 65	Authors' calculations using WDI data
Urbanisation level	Urban population as a share of the total population	World Bank WDI, May 2015
War dummy	= 1 if year featured an armed conflict resulting in 1000 or more deaths, 0 otherwise	UCDP/PRIO Armed Conflict Dataset, v4-2015
GDP growth	Annual growth in gross domestic product	World Bank WDI, May 2015
Current account balance	Current account balance as a share of GDP	IMF WEO, April 2014

Democracy	Average of Freedom House and Imputed Polity measures of democracy, transformed to a scale of 0-10	Quality of Governance Database, 2015
Countries on IMF programmes	Total number of countries under IMF programmes in a given year	Authors' calculations
UN General Assembly voting affinity with United States	Voting similarity index on a scale ranging from 0 to 1, where 1 is perfect similarity and 0 is perfect difference	United Nations General Assembly Voting Data, 2013

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Web Appendix 3. Descriptive statistics

	N	Mean	Median	SD	Min	Max
Dependent variable						
Government health spending per capita (log)	285	2.348	2.360	0.777	0.578	4.461
Explanatory variables						
L.Binding conditions	288	16.028	17.000	15.851	0.000	72.000
L.Binding conditions when L.IMF programme dummy = 1	*202*	*22.129*	*24.00*	*14.842*	*0.000*	*72.000*
L.IMF programme dummy	288	0.701	1.000	0.458	0.000	1.000
L.GDP per capita (log)	288	6.155	6.078	0.589	3.913	7.915
L.ODA per capita (log)	288	3.815	3.850	1.007	0.237	6.504
Dependency ratio	288	88.406	87.433	8.469	55.435	110.957
Urbanisation level	288	4.054	4.031	1.105	0.187	8.621
War dummy	288	0.014	0.000	0.117	0.000	1.000
Additional selection variables						
Countries on IMF programmes	288	58.944	62.500	9.412	36.000	72.000
L.GDP growth	288	5.006	4.400	8.728	-32.832	106.280
L.Capital account balance	276	-6.882	-6.589	8.140	-54.754	25.335
L.Democracy	288	5.451	5.417	2.388	1.000	10.000

Web Appendix 4. Correlation matrix

	1	2	3	4	5	6	7	8
Government health spending per capita (log) [1]	1.000							
L.IMF programme dummy [2]	0.014	1.000						
L.Binding conditions [3]	0.012	0.582	1.000					
L.GDP per capita (log) [4]	0.836	-0.123	-0.126	1.000				
L.ODA per capita (log) [5]	0.474	0.229	0.267	0.283	1.000			
Dependency ratio [6]	-0.416	0.262	0.136	-0.480	-0.204	1.000		
Urbanisation level [7]	-0.201	0.093	0.048	-0.368	-0.158	0.555	1.000	
War dummy [8]	-0.122	0.011	-0.004	-0.129	-0.040	-0.049	-0.272	1.000

Web Appendix 5. Controlling for selection bias using the Heckman method

Since participation in IMF programmes is a non-random treatment (i.e., countries opt into the programme), then 'selection bias' – a form of endogeneity – may be introduced to the analyses if the same forces that determine IMF participation also affect government health expenditures. If we fail to account for these factors then their effects may erroneously be attributed to IMF programme participation or conditionality. While observable variables affecting both selection into an IMF programme and government health spending are already included as controls in our model (e.g., GDP per capita), we cannot directly control for unobservable factors such as 'political will' (i.e., an executive dedicated to overcoming economic difficulties versus one that is more interested in personal empowerment).

To address the issue of 'selection bias' we adopt Heckman's (1979) two-step method. First, we run a probit regression to predict IMF participation:

$$IMF_{i,t} = \gamma Z_{i,t} + \eta_{i,t} \quad \text{(a)}$$

where IMF participation is assumed to be a linear function of a list of covariates, $Z_{i,t}$, and a stochastic component, $\eta_{i,t}$. In the presence of selection bias, ε from equation (1) in the main manuscript[1] and η from equation (a) are correlated.

We then compute the 'inverse-Mills ratio' or hazard, $\hat{\lambda}$, for each observation in the sample:

$$\hat{\lambda}_{i,t} = \frac{\varphi(Z_{i,t}\hat{\gamma})}{\Phi(Z_{i,t}\hat{\gamma})} \quad \text{(b)}$$

where φ denotes the standard normal density function, Φ the standard normal cumulative distribution function, and $\hat{\gamma}$ is an estimated value taken from equation (a).

[1] For reference, equation (1) is presented below:

$$HXP_{it} = \alpha + \beta_1 IMFCOND_{it-1} + \beta_2 IMFPROG_{it-1} + \beta_3 GDPPC_{it-1} + \beta_4 ODA_{it-1} + \beta_5 DEP_{it} + \beta_6 URBAN_{it} + \beta_7 WAR_{it} + \beta_8 INVMILLS_{it} + \mu_i + \psi_t + \varepsilon_{it}$$

Second, we add the estimated hazard to the vector of controls in equation (1). Its coefficient is interpreted as follows: if significantly negative, then unobserved variables that make IMF participation more likely are associated with lower government health expenditure; if significantly positive, then unobserved variables that make IMF participation more likely are associated with higher government health expenditure; if non-significant, then there is no association.

We tested alternative specifications for the first-stage probit model used in the relevant literature and all performed similarly, correctly predicting circa 80% of the cases. For our specification, right-hand variables include the total number of countries on IMF programmes, log GDP per capita (lagged one year), log ODA per capita (lagged one year), GDP growth (lagged one year), current account balance (lagged one year), level of democracy (lagged one year), dependency ratio, urbanisation, and occurrence of war. We could not include government balance (lagged one year) as it unduly reduced observations due to missing data. The total number of countries on IMF programmes acts as our "exclusion restriction" (Oberdabernig, 2013; Sturm, Berger, & de Haan, 2005): a variable that is significant in explaining the country's participation decision in IMF programs but is not correlated with the dependent variable of the outcome equation, in our case government health spending.

Frequencies of actual and predicted outcomes

		Predicted		
		0	1	Total
Actual	0	36	41	77
	1	13	186	199
	Total	49	227	276

Correctly predicted: 80.4%

Results of probit model to generate inverse-Mills ratio	
Dependent variable: IMF programme participation	
Countries on IMF programmes	0.033***
	[0.009]
GDP growth (lagged)	0.008
	[0.014]
Capital account balance (lagged)	0.006
	[0.012]
Democracy (lagged)	0.014
	[0.044]
Log GDP per capita (lagged)	-0.422**
	[0.210]
Log ODA per capita (lagged)	0.473***
	[0.101]
Dependency ratio	0.042***
	[0.015]
Urbanisation	0.021
	[0.125]
War	-0.786
	[0.736]

Constant	-4.274** [1.976]
N	276
pseudo R-sq	0.201

Standard errors in brackets

* p<0.10, ** p<0.05, *** p<0.01

For additional examples of selection bias corrections in studies on the effects of IMF, see Clements et al. (2013), IEO (2003), Nooruddin and Simmons (2009), and Vreeland (2003).

Works cited:

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Web Appendix 6. Robustness checks

Model	Base: Heckman	Robust: 2SLS	Robust: Heckman	Robust: No Outliers (observations with >=50 conditions)	Robust: No Outliers (observations with >=40 conditions)
Dependent variable	Log government health expenditure per capita	Log government health expenditure per capita	Government health expenditure (% of GDP)	Log government health expenditure per capita	Log government health expenditure per capita
IMF condition (lagged)	-0.0025*	-0.0161*	-0.0068*	-0.0033**	-0.0028*
	[0.0009]	[0.0063]	[0.0027]	[0.0011]	[0.0013]
IMF programme (lagged)	0.1161	0.3065	0.2959	0.1232	0.1275
	[0.0678]	[0.2083]	[0.1407]	[0.0677]	[0.0703]
Log GDP per capita (lagged)	0.5426	0.7993***	-0.8363	0.5380	0.5502
	[0.4186]	[0.2043]	[0.9478]	[0.4265]	[0.4455]
Log ODA per capita (lagged)	0.1846**	0.2679***	0.4163**	0.1878**	0.1769**
	[0.0475]	[0.0666]	[0.1378]	[0.0499]	[0.0501]

Dependency ratio	0.0046	0.0103	0.0121	0.0049	0.0058
	[0.0068]	[0.0064]	[0.0179]	[0.0068]	[0.0069]
Urbanisation	0.0917	0.0496	0.2103*	0.0915*	0.0872
	[0.0434]	[0.0393]	[0.0931]	[0.0419]	[0.0463]
War	0.0849	0.1194	0.5843*	0.0846	0.0383
	[0.2365]	[0.2227]	[0.2640]	[0.2421]	[0.2466]
Inverse-Mills ratio	0.0866**		0.1372	0.0900**	0.0860**
	[0.0284]		[0.0674]	[0.0265]	[0.0256]
Constant	-2.797	-4.9278**	3.1091	-2.807	-2.9128
	[3.0237]	[1.5466]	[7.1318]	[3.0707]	[3.2122]
Country/Year dummies	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes
Country-years	276	272	276	271	257
R^2	0.9143	0.8601	0.7078	0.9149	0.9178
Number of countries	16	16	16	16	16

Notes: Standard errors in brackets; IMF variables are instrumented with United Nations General Assembly (UNGA) voting affinity with the United States and countries under IMF programmes in the 2SLS model; * $p<0.05$, ** $p<0.01$, *** $p<0.001$